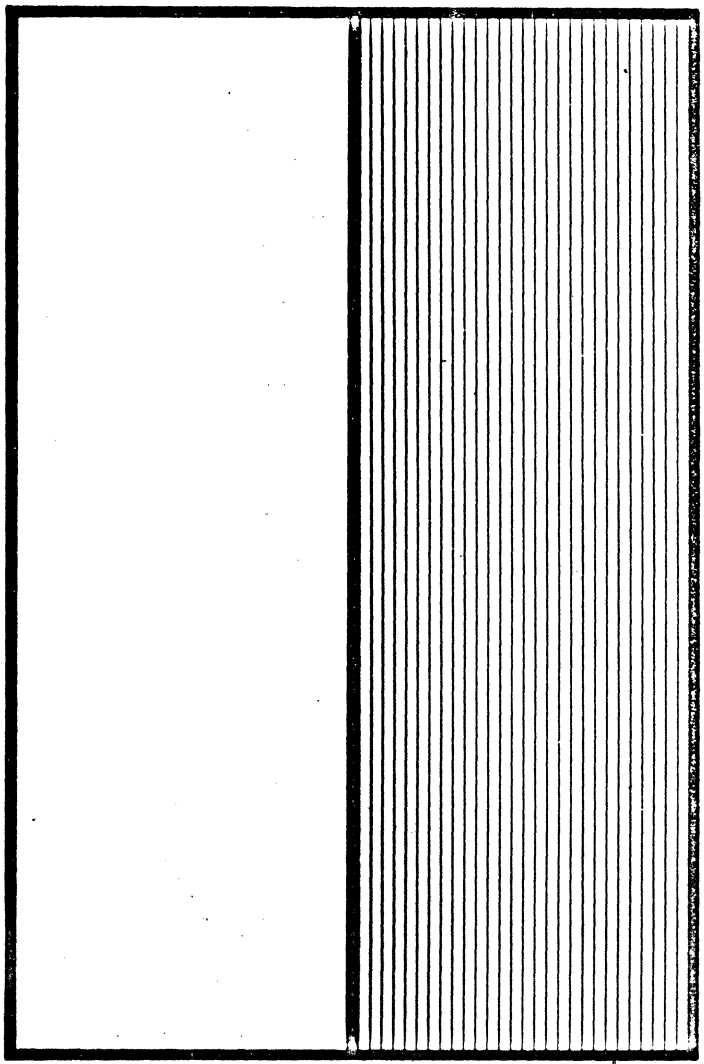
4091706

SPERRY RAND

UNIVAC 9400 SYSTEM

PROGRAM DESCRIPTION DRAWING



CUSTOMER ENGINEERING

SPERRY RAND UNIVAC

DRAWING NO. 4091706

REVISION -

CUSTOMER ENGINEERING
PRODUCT DIAGNOSTIC SOFTWARE

9400 - 5024/8424 or 8425 Disc Read/Write Test #2
D2022

	SIGNATURE	TITLE	DATE
APPROVAL			
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REVISION STATISTICS RECORD

DWG REV	MSTR REV	RELEASE DATE	DESIGNER NAME	EIR NUMBER	FCO NUMBER
-	N		PDS Phila., Pa.	C12607	

REVISION DESCRIPTION RECORD

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-	Release to 9400 Test Library

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1. INTRODUCTION

1.1 Purpose. This document describes a 9400 Maintenance test program for the 5024/8424 of 25 Subsystem.

1.2 Major Objectives. The objective of this test program is to perform a test of the 5024/8424 or 25 Subsystem. Test organization and operator options are intended to satisfy the needs of Design, Quality Control and Field Engineering personnel in checkout, acceptance and maintenance activities.

1.3 Equipment Configurations. All equipment configurations must be connected to a Selector I-O channel of the 9400 Processor. This test will operate the following equipment configuration:

- Disc File Control - Type 5024
- Disc Drive - Type 8424 or 25
- Disc Pack Assembly - Type F12 14-01

1.4 Associated Software. This program has DSKH included as an integral part of the program. This is the standard disc handler routine used by all Disc Maintenance test programs. It is the interface between the program and MCR, which performs program load, parameterization, execution, deletion, I-O handling, and message handling.

1.5 Reference Documents

DRAWING	DESCRIPTION
S70040	UNIVAC 9400 Processor, Type 3019-00 and -01.
---	UNIVAC 9400 Dual I-O Selector Channel, Type XXXX-00 and -01.
P10076	Disc File Control, Type 5024. 8424 or 25
4091622	Maintenance Control Routine.
4091623	Parameter and Message Routines.
4091670	5024/8414 Disc Program Handler.

2. FUNCTIONAL DESCRIPTION

2.1 General Organization. This program tests the read and write Home address and track descriptor record commands of the 5024/8424 disc subsystem. Various sized Write and Read Track Descriptor Record and Write and Read Home Address commands are executed. Writing and reading of maximum size records using all of the Write and Read commands are tested. Multiple track operations and writing on a defective track are tested. Setting of the overrun bit is tested with the various write commands.

2.2 Program Description

2.2.1 Test 1 (Group Test)

Objective - The objective of test 1 is to enable several tests to be internally selected simply by entering subtest 1. Test 1 selects tests 11 thru 21.

Method - The program places bits into the parameter location which tells DSKII which tests to enter.

2.2.2 Test 11 (Write and Read Track Descriptor Record Placement and Valid Chaining Sequence)

Objective - This test verifies that TD Records are written properly on a track. It also tests all of the valid chaining sequences for Read and Write TD Record commands.

Method - A track descriptor record is written, then read back to verify that the record was placed in its correct position on the track and does not overlay the Home Address. All of the valid chaining sequences for writing and reading TD records are issued.

2.2.3 Test 12 (Write and Read Various Size Track Descriptor Records)

Objective - Normal and truncated Write and Read TD Record commands are issued

Method - Various sized TD records, including truncated records, are written, then read back to verify that the correct record lengths were written.

2.2.4 Test 13 (Track Descriptor Record Track Erasing)

Objective - Track erasing after writing a Track Descriptor record is tested.

Method - A Write TD Record command followed by a Sense I-O command in the same chain is executed. The Sense I-O will be executed after the track is erased.

2.2.5 Test 14 (Maximum Size Count, Key and Data Record, Key and Data Record, Data Record, and Track Descriptor Record)

Objective - This test determines the size of the largest Count, Key and Data Record, Key and Data Record, Data Record, and TD Record that can be written on a track.

Method - The largest Count, Key and Data record that can be written on a Track in a single attempt is written. Next, the largest Count, Key and Data record that can be written ten times in succession is written. Both these record sizes are printed. The second record size will then be written ten more times, with one of the following bit configurations extended throughout the record each time the record is written: 00,01,02,04,08,10,20,40,80,FF (hexadecimal). The record is read back and its contents verified each time the record is written.

The above procedure is repeated for the Write Key and Data, Write Data, and Write TD Record commands.

2.2.6 Test 15 (Maximum Size Count, Key and Data Record Followed by a 128 Byte Key and Data Record)

Objective - This test determines the size of the largest Count, Key and Data record that can be written on a track and the size of the alpha and beta gaps of a succeeding 128 byte Key and Data record.

Method - An attempt is made to write two Count, Key and Data records on a track. The size of the first record is the largest record that can be written ten times in succession on a track. The second record has a key length of 61 and a data length of 61. The attempt will be aborted, and the chain will be re-executed with the size of the first record reduced by one byte. This prodedure will be repeated both records can be successfully written ten times in succession. The original and final size of the first record will be printed, as well as the total number of bytes in record 2, including the bytes in the "a" and "b" gaps.

2.2.7 Test 16 (Maximum Size Track Descriptor Record)

Objective - This test determines the size of the largest Track Descriptor Record that can be written on a track. It also writes the record with all of the possible bit configurations within each byte.

Method - Test 4 will be repeated for the Write TD Record command, with the exception that the largest record that can be written ten times in succession on a track will then be written 256 times. The contents of each byte in the record will begin with binary 0 and will be incremented by 1 on each writing until binary 255 is reached. Each record will be read back and its contents verified.

2.2.8 Test 17 (Write and Read Various Size Home Addresses and Valid Chaining Sequences)

Objective - Normal and truncated Write and Read Home Address commands are executed. All of the valid chaining sequences for Write and Read Home Address are also issued.

Method - Various sized Home Address records are written, then read back to verify that the correct length was written. All of the valid chaining sequences for writing and reading Home Address are tested.

2.2.9 Test 18 (Write Home Address Track Erasing)

Objective - Track erasing after writing a Home Address is tested.

Method - A Home Address and a Track Descriptor record are written. Then Home Address is written and a search is performed for the TD record. A Write TD Record command followed by a Sense I-O command in the same chain is executed. The Sense I-O will be executed after the track is erased.

2.2.10 Test 19 (Multiple Track Operations)

Objective - Track switching with the Multiple Track bit set is tested with Read Count, Key and Data Record and Read Home Address commands.

Method - Multiple Track Operations - Track switching with the M bit set is tested using the Read Count, Key and Data command. The chain is then reissued after setting a file mask inhibiting seeks.

Switching from an alternate track with the M bit set is tested. Switching to an alternate track is also tested. Switching on a Read Home Address command with the M bit set is tested.

2.2.11 Test 20 (Defective Track)

Objective - This test makes certain that a Count, Key and Data record cannot be written when the defective track bit is set in the Home Address flag, but that it can be written when the alternate track bit is set.

Method - Defective Track - An attempt is made to write a Count, Key and Data record after the defective track bit of the Home Address flag has been set. A Count, Key and Data record is then written after the alternate track bit of the Home Address flag is set.

2.2.12 Test 2) (Repetitive Transfer in Channel Overrun)

Objective - This test determines the time that elapses between the successful completion of a Search command and a Write command.

Method - Chains are executed for the purpose of setting the overrun bit in Sense Byte 0. Several series of chains are issued containing a variable number of Transfer In Channel commands. The last TIC command will always be followed by a write command. The first chain in each series begins with one TIC command. The number of TIC commands is increased by one before each chain in a serie is executed until the overrun bit is set. A series of chains is issued for each of the following commands: Write CKD, Write KD, Write Data, Write Record 0, and Erase. A message stating the number of TIC commands that preceded the write command is printed when overrun occurs in each series.

3. OPERATING PROCEDURES

The Disc Handler Routine is used as a standard interface between the program and MCR. All operating procedures described in the DSKII documentation hold equally well for this program.

3.1 Initialization. See DSKII documentation. The program is called by typing in the name D2022

3.2 Test Program Parameters. See DSKII documentation.

3.3 Test Program Messages. The DSKII documentation describes all test entry and exit messages and a standard I-O message. Data errors are detected by the program, and all data error messages are contained in the program. Register 9 is used to jump to the various error routines, so its contents are printed with most error messages.

3.3.1 Test 1 - A simple parameter setting is performed here, so no errors can occur.

3.3.2 Test 11 - Placement of Track Descriptor Records

```
R9XXXXXXXX
OVERLAID RECORDS      X----------X
SHOULD BE             X----------X
```

Home Address and Record 0 are printed as they were written and as they should have been written.

3.3.3 Test 12 - Write and Read Various Size Track Descriptor Records

```
R9XXXXXXXX
INCORRECT RECORD      X----------X
  SHOULD BE           X----------X
```

A TD Record is printed as it was read or written and as it should have been read or written.

Write and Read a 255 Byte Key Record (Track Descriptor Record Command)

```
R9XXXXXXXX   255 BYTE KEY RECORD
INCORRECT  XX SHOULD BE XX - LOC. nnnn
```

3.3.4 Test14 - Write and Read Maximum Size CKD, KD, Data, and TD Records

```
R9XXXXXXXX
MAXIMUM SIZE (CKD, KD, DATA or TD) RECORD INCORRECT XX SHOULD BE XX - LOC. nnnn
R9XXXXXXXX
MAXIMUM SIZE (CKD, KD, DATA or TD) RCD WRITTEN ONCE - nnnn BYTES
MAXIMUM SIZE (CKD, KD, DATA or TD) RCD WRITTEN 10 TIMES - nnnn BYTES
```

3.3.5 Test 15 - Write Maximum Size Count, Key and Data Record Followed by 128 Byte Record

```
CKD RECORD STARTING SIZE - nnnn BYTES ENDING SIZE - nnnn BYTES
SIZE OF 2ND RECORD - nnnn BYTES INCLUDING A AND B GAPS
```

3.3.6 Test 16 - Write a Maximum Size Track Descriptor Record.

Same printout as in Test 14 above.

3.3.7 Test 17 - Write and Read Various Size Home Addresses

```
R9XXXXXXXX
HA INCORRECT          X----------X
  SHOULD BE           X----------X
```

A Home Address is printed as it was read or written and as it should have been read or written.

3.3.8 Test 19 - Multiple Track Operation - Successful Track Switching

```
R9XXXXXXXX
TRACK SWITCHING FAILED - READ RECORD        X----------------------------X
```

The record that was read instead of record 1 on the next track will be printed.

Multiple Track Operation - Switch on Home Address

```
R9XXXXXXXX
TRACK SWITCHING FAILED - READ HA            X--------X
```

The Home Address that was read is printed.

Multiple Track Operation - Switching from Alternate Track Not Permitted

```
R9XXXXXXXX
SWITCHING FROM ALTERNATE TRACK FAILED -
READ RECORD                                 X--------X
```

Switching from an alternate track failed.

3.3.9 Test 21 - Repetitive Transfer in Channel Overrun

```
nn TICS EXECUTED BEFORE WRITE CKD AFTER SEARCH ID EQUAL CAUSED OVERRUN
nn TICS EXECUTED BEFORE WRITE KD AFTER SEARCH ID EQUAL CAUSED OVERRUN
nn TICS EXECUTED BEFORE WRITE DATA AFTER SEARCH ID EQUAL CAUSED OVERRUN
nn TICS EXECUTED BEFORE WRITE CKD AFTER SEARCH KEY EQUAL CAUSED OVERRUN
nn TICS EXECUTED BEFORE WRITE DATA AFTER SEARCH KEY EQUAL CAUSED OVERRUN
nn TICS EXECUTED BEFORE WRITE RO AFTER WRITE HA CAUSED OVERRUN
nn TICS EXECUTED BEFORE WRITE CKD AFTER WRITE CKD CAUSED OVERRUN
nn TICS EXECUTED BEFORE ERASE AFTER WRITE CKD CAUSED OVERRUN
```

3.3.10 NOTE: Whenever a record is read incompletely, each missing byte is identified by printing an FF_{16}.

4. SUPPLEMENTARY DATA

4.1 Supplementary Software Information. Each test of the program is entered separately by DSKII and stands alone. It could be extracted from the rest of the program and either be eliminated or assembled by itself with DSKII.

4.2 Supplementary Hardware Information. See DSKII documentation.